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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Mitsuaki Komino

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EXAMINER

CHEN, KEATH T

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

03/03/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/556,067	Applicant(s) KOMINO ET AL.	
	Examiner KEATH T. CHEN	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,6-8,10,11 and 13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-8,10,11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/22/2009 has been entered.

Response to Amendment

The claim amendment filed on 01/22/2009, addressing rejection of claims 1-2, 6-8, 10-11, and 13 from the final office action (07/22/2008), by amending claims 1-2, 6-8, and 10-11 is acknowledged and will be addressed below.

Election/Restrictions

1. Claims 3-5, 9, and 12 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites “the attaching portion provided in a flange shape” in line 6 and “the attaching portion provided in a pipe shape” in line 8. It is not clear what shape the Applicants are claiming. Claim 8 will be examined as either shape.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-2, 6-7, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umotoy et al. (US 20010054381, hereafter '381), in view of Nakamura et al. (US 4346285, hereafter '285) and Myers et al. (US 4980557, hereafter '557).

'381 teaches some limitations of:

Claim 1: A semiconductor manufacturing device (Fig. 2a, cross section view of Fig. 1) comprising: a processing chamber (#250, [0033]); a supply passage (showerhead #300, Fig. 1, [0032]) for supplying a processing gas to an inside of the processing chamber; a transferring passage (#260, slit valve, [0050], lines 7-11) through which a wafer is to be put into and taken out of the processing chamber; an exhaust passage (#600, exhaust assembly, [0030]) through which the processing gas inside the processing chamber is to be exhausted; and a heating unit (heated liner #200 with embedded heater #215, [0034], lines 5-7) formed so as to detachably (liner is intrinsically detachable) cover and heat an inner wall face (inside of #250, [0033], lines 9-11) of the processing chamber, the heating unit including a heating main body (#215 and #200) to be disposed adjacent to the inner wall face, and an attaching portion

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(clamping plate #216) formed into a flange shape or a pipe shape (#216 is both flange shape and a shallow pipe shape) so as to extend and open to an outside of the semiconductor manufacturing device (as shown in Fig. 2a).

'381 also teaches an embedded resistive heater #215 that are formed along the inner wall face, but is silent on the shape of the embedded heater. '381 further recognized the difficulty to achieve uniform heating of the chamber walls ([0006]).

'381 does not explicitly teach the limitations of:

Claim 1: (an attaching portion formed into a flange shape or a pipe shape) integrally with the heating main body, wherein the heating main body includes a thin plate-shaped outer shell and a thin plate-shaped inner shell that are formed along the inner wall face, a thin plate-shaped resistive heating element sandwiched between and covered by the outer shell and the inner shell so as to have a shape substantially identical so that of the outer shell and the inner shell, and a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas.

'285 is an analogous art in the field of heating device (field of the invention, which '381 lacks of details), particularly in achieving uniform heating (col. 2, lines 32-38, '381, [0006]). '285 teaches a heat generation unit/heating main body (#104, Fig. 5, col. 5, lines 17-22) heating main body includes a thin plate-shaped outer shell and a thin plate-shaped inner shell (#104b and #104c), a thin plate-shaped resistive heating element

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(#104a) sandwiched between and covered by the outer shell and the inner shell so as to have a shape substantially identical so that of the outer shell and the inner shell (as shown in Fig. 5).

'557 is an analogous art in the field of optimizing function of heater (col. 3, lines 25-29), particularly in uniform heating (col. 6, lines 1-2; '381, [0006]). '557 teaches using ceramic sealant/spacer (#23, Fig. 1a, col. 6, lines 3-4) to protect one end of the heater that is exposed to the testing/processing environment (see Fig. 7) while the other end is exposing to the outside (Fig. 1a) without ceramic sealant. Note that ceramic sealant is an alternative to one piece arrangement (Fig. 1b) of embedded heater.

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '285 and '557 with '381. Specifically, to have adopted a heater made of thin plate-shaped resistive heating element sandwiched by a pair of metal electrode, as taught by '285, to replace the heater #215 embedded liner #200 in the apparatus in Fig. 2a of '381; for the purpose of improving the heating uniformity, as taught by '285 (col. 2, lines 32-38) and required by '381 ([0006]); and to have used ceramic sealant/spacer to seal the heater end that has a space in the processing region (the liner portion above #215) while leaving the other end not exposed to processing region open, as taught by '557, therefore to have had a spacer/sealant provided between the outer shell and the inner shell at an edge region of

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the outer shell and the inner shell which is to be exposed to the processing gas. The motivation to use sealant instead of integral end region as in liner #200 is suitability use.

The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

As for the (an attaching portion formed into a flange shape) “integrally with the heating main body”, it is mere integration of liner #200 with the clamping plate (#216) of ‘381.

‘381, ‘285, and ‘557 disclose the claimed invention except for (an attaching portion formed into a flange shape) “integrally with the heating main body”. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to integrate liner with clamping plate, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

‘381 also teaches some limitations of:

Claim 6 (besides the limitations of claim 1): A heating unit (heated liner #200 with embedded heater #215, [0034], lines 5-7) for heating, in a semiconductor manufacturing device, an inner wall face (inside of #250, [0033], lines 9-11) of a processing chamber, the heating unit (#200 and #215) formed so as to detachably (liner is intrinsically

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detachable) cover and heat the inner wall face an inner wall face (inside of #250, [0033], lines 9-11).

For substantially the same reason as discussed in Claim 1 rejection above, claim 6 is rejected.

'381 further teach the limitations of:

Claims 2 and 7: The semiconductor manufacturing device as set forth in claim 1 (or the heating unit as set forth in claim 6), wherein the heating unit includes a connector (AC connectors inside feed through portion #214, [0034] lines 11-13) that is provided at the attaching portion (which is annular, also close to #214) to draw out a wire (bottom right of Fig. 2a) for conducting electricity to the resistive heating element and a wire of a temperature sensor (#212, thermocouple, [0034] 2nd last sentence) for detecting a temperature of the resistive heating element.

Claim 13: The heating unit as set forth in claim 7, wherein the heating unit is to be disposed so as to define a space ([0033], line 9-11) for insulating heat between the heating unit and the inner wall face.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381, '285, and '557, in view of Steger et al. (US 5788799, hereafter '799).

'381, '285, and '557, together, teach all limitations of claim 7, as discussed above.

'381 further teaches some limitations of claim 8:

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The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes a chamber heating unit that is disposed adjacent to the inner wall face of the processing chamber, and the chamber heating unit includes the heating main body (#200 and #215), the heating main body being cylindrically formed (#200 is cylindrical, [0033], line 9) to be disposed adjacent to a side wall face (inside of #250, [0033], lines 9-11) of the processing chamber and the attaching portion provided in a flange shape (#216 is in a flange shape) at an end of the heating main body, and the attaching portion provided in a pipe shape (#216 is a shallow pipe shape) to extend on a lower face of the heating main body (as shown in Fig. 2a).

'381, '285, and '557, together, do not teach the other limitations of:

Claim 8: The heating main body having a disk-shape so as to be disposed to face a bottom wall face of the processing chamber.

'799 is an analogous art in the field of CVD (field of the invention, '381, field of the invention), particularly in temperature controlled liner (col. 4, lines 11-13, '381, [0009]). '799 teaches a disk-shape lower temperature control liner (Fig. 2, #106, col. 7, lines 50-55, part of liner #102) at the bottom of the chamber, in addition to the upper liner (#104) at the side wall of the chamber .

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '799 with '381, '285, and '557.

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Specifically, to have adopted a heater at the bottom of the chamber, as taught by '799, to the apparatus of Fig. 2a of '381, while keeping an attaching portion like Fig. 2b of '381. This heater would have a disk-shape (despite a central hole, which has the same shape as the disk disclosed in Fig. 7 of instant application) and face a bottom wall face of the processing chamber.

The motivation would have been to slow deposit rate on the lower (or bottom) surface ('799, col. 8, line 18-24).

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381, '285, and '557, in view of Iwabuchi (US 5755255, hereafter '255).

'381, '285, and '557, together, teach all limitations of claim 7, as discussed above.

'381, '285, and '557, together, do not teach the limitations of:

Claim 10: The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes a transferring passage heating unit that is disposed adjacent to an inner wall face of the transferring passage, and the transferring passage heating unit includes the heating main body, the heating main body being cylindrically formed and having a roughly rectangular section and an attaching portion provided in a flange shape on the heating main body.

'255 is an analogous art in the field of semiconductor manufacturing (title), particularly in avoiding contamination of gate valve during operation (col. 2, lines 24-27).

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'255 provides heating element (Fig. 7A, #243, col. 8, lines 24-28) in an inner wall face of the transferring passage (of gate valve) having cylindrical heating main body (as shown in Fig. 7D) and roughly rectangular section.

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '255 with '381, '285, and '557. Specifically, to have adopted the heating element of the gate valve, as taught by '255, to the apparatus of Fig. 2a of '381.

The motivation would have been to avoid contamination of gate valve during operation ('255, col. 2, lines 24-27).

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381, '285, and '557, in view of Ohmi et al. (US 20030007917, hereafter '917).

'381, '285, and '557, together, teach all limitations of claim 7, as discussed above.

'381, '285, and '557, together, do not teach the limitations of:

Claim 11: The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes an exhaust passage heating unit to be disposed adjacent to an inner wall face of the exhaust passage, and the exhaust passage heating unit includes the heating main body and the attaching portion provided in a flange shape on the heating main body, the heating main body being cylindrically formed.

'917 is an analogous art in the field of CVD (field of the invention, '381, field of the invention), particularly in avoiding deposition to the processing equipment (exhaust piping, [0023]). '917 provides heating equipment to the exhaust gas passage of the process chamber ([0060]).

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '917 with '381, '285, and '557. Specifically, to have adopted the heating of the exhaust passage, as taught by '917, to the apparatus of Fig. 2a of '381, while utilizing the nickel-plated aluminum liner with a flange (Fig. 2c) from '381 as the heating means at inner wall face of the exhaust passage. The heater would have conformed the shape of the exhaust as being cylindrical.

The motivation would have been to reduce deposition in the exhaust piping ('917, [0023]).

Response to Arguments

Applicant's arguments filed on 01/22/2009 have been fully considered but they are not persuasive:

7. In regarding to 35 USC 112 rejection first paragraph rejection, Applicants' amendment overcome the rejection. However, the amendment also introduce 35 USC 112 second paragraph rejection, as discussed above.

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8. In regarding to 35 USC 103 rejection, Applicants' argument is that replace liner 200 of Umotoy '381 with Nakamura '285's heater would render the device unsatisfactory for its intended purpose because of feedthrough portion for AC, the dowel pins 220, some parts will be exposed, and won't be able to support edge ring 550, see the first and second complete paragraphs of page 11.

This argument is found not persuasive.

In response to applicant's argument that some other parts cannot be incorporated in the '285's heater, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Furthermore, the examiner considers adding AC feed to the heater ('285 already has a power feed, see Fig. 5), fitting a dowel to the sheet heater, select the width of sheet heater with enough strength to support edge ring 550 are all well within the skill of a person of ordinary skill in the art. The examiner does not agree a person of ordinary skill in the art would have exposed some parts while replacing liner with sheet heater according to the shape of the liner.

9. Applicants argue that '381 and '285 do not teach "a spacer provided between the outer shell and the inner shell at an edge region of the outer shell and the inner shell which is to be exposed to the processing gas", see the last complete paragraph of page

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11, and Myers '557 teaches the end-loops of the heater wire 21 is protected by a ceramic sealant and such combination would render '381 devices unsatisfactory for its purpose, see the first complete paragraph of page 12.

This argument is found not persuasive.

The examiner already discussed the issues Applicant raised in the combination of '381 and '285 are merely bodily incorporation and will not change the purpose of serving the liner/heater as liner/heater as well as other physical connections.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The combination is based on '381, '285, and '557. '381 teaches an embedded heater but is silent on how it is embedded. '285 teaches metal plate sandwich heater plate. A person of ordinary would adopted the teaching of '285 to build an embedded heater by using metal plates to replace the integrated embedded liner/heater according to the shape of the liner/heater (#200 and #215) of Fig. 2a of '438, which include a section above #215 without embedded heater (the shaded part above the heater #215). A person of ordinary skill in the art would notice that the heater of '438 is not exposed to plasma (the shaded part above the heater #215) and the replacing the heater/liner with metals plates would leaves space between the metal plates (above the heater #215). '557 teaches ceramic sealant to protect one end of the heater. With sealant between the

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space above the heater 215, an combination embedded heater would have reproduced the shape as shown in Fig. 2a of '381.

The examiner does not agree with Applicants' narrow interpretation that '557 teaches only applying sealant protrude beyond the sensor. A person of ordinary skill in the art would have recognized that the sealant can be applied to where it's needed and function to seal with reasonable expectation success.

The examiner does not agree with Applicant's narrow interpretation that '285 teaches only metal plates flush with heater plate. A person of ordinary skill in the art would have recognized that extending electrode plate would function as heater with reasonable expectation of success; particularly to achieve the embedded heated as shown in Fig. 2a of '381.

10. Applicants' argument in regarding to dependent claims is based on the patentability of the parent claims. Since the parents claims are found not patentable, all dependent claims are not patentable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 6:30AM-3 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792